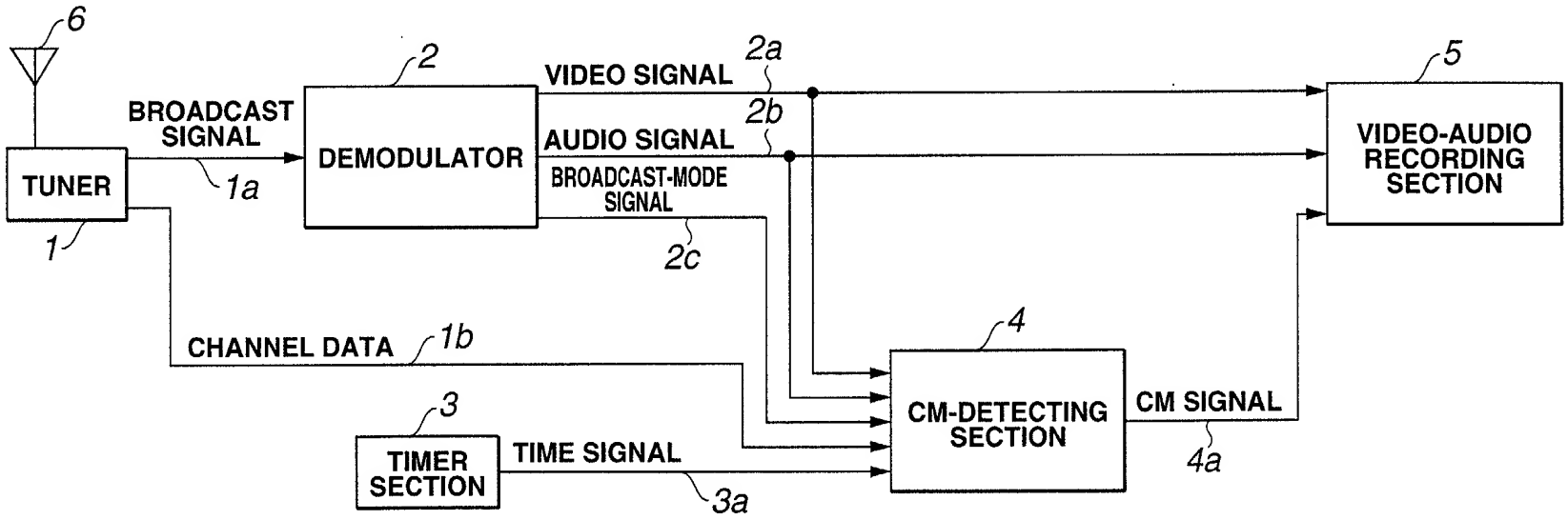
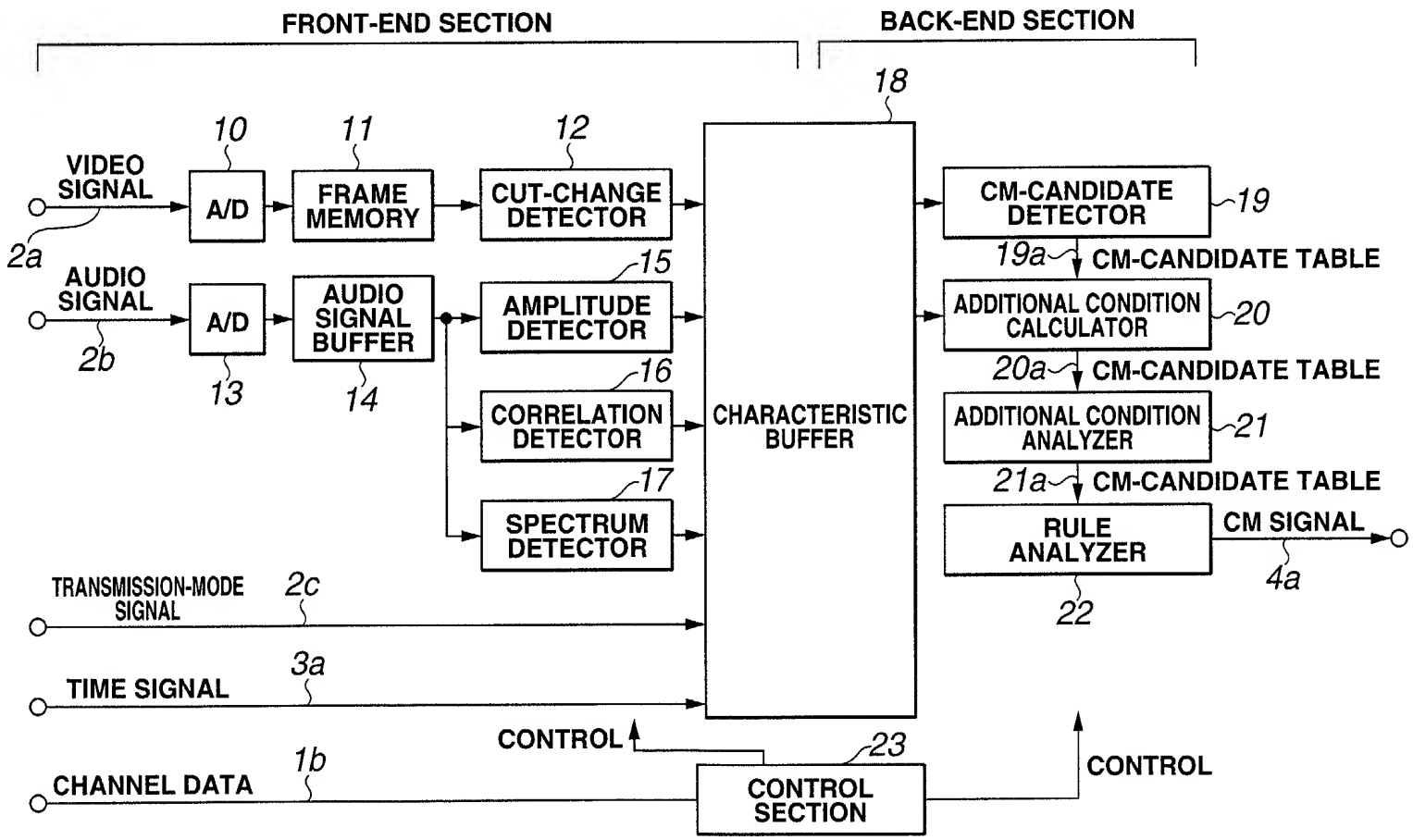


FIG.1



CM-DETECTING SECTION 4

FIG.2

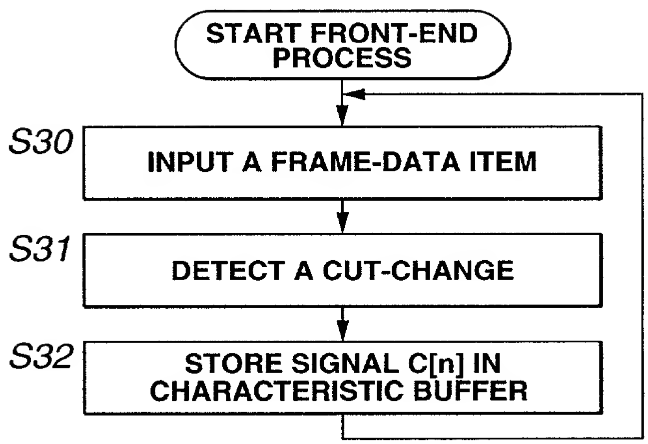

START FRONT-END PROCESS
S30
INPUT A FRAME-DATA ITEM
S31
DETECT A CUT-CHANGE
S32
STORE SIGNAL C[n] IN CHARACTERISTIC BUFFER

FIG.3

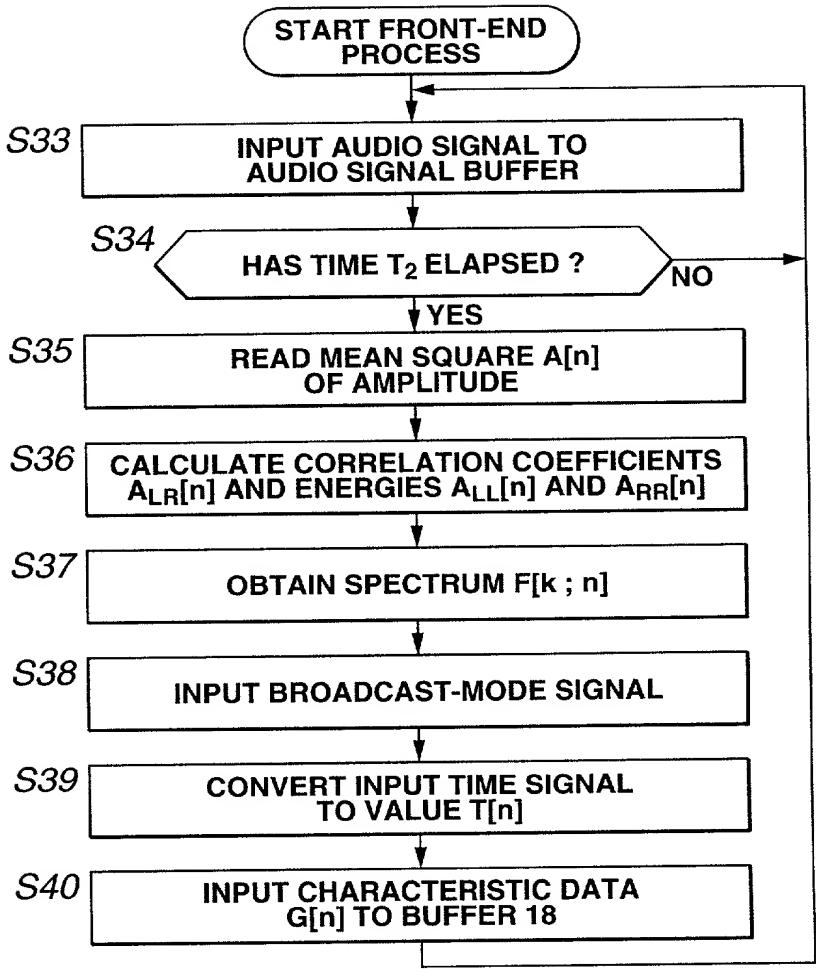


FIG.4

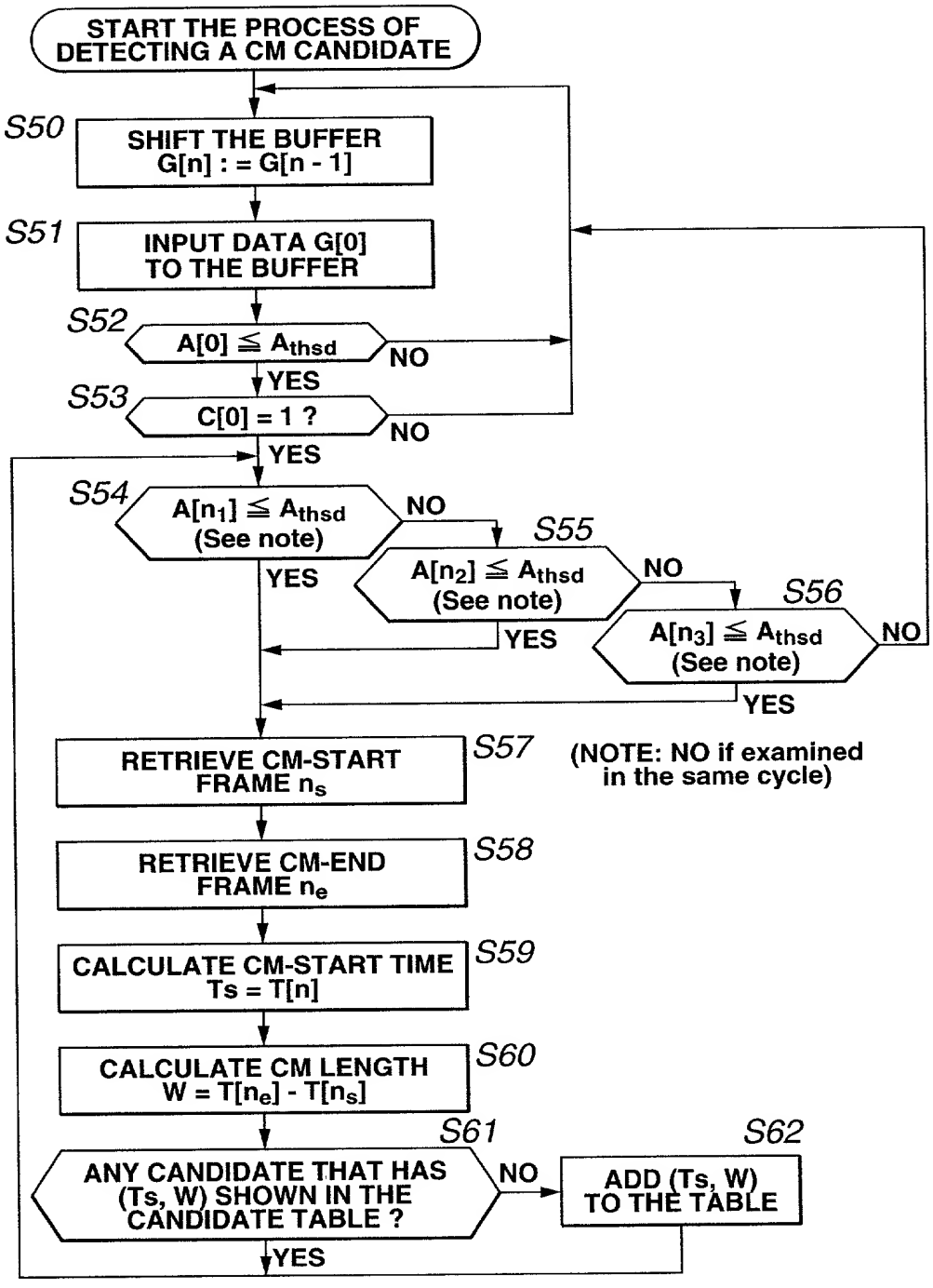

START THE PROCESS OF DETECTING A CM CANDIDATE
S50
SHIFT THE BUFFER G[n] : = G[n - 1]
S51
INPUT DATA G[0] TO THE BUFFER
S52
A[0] ≦ Athsd
NO
YES
S53
C[0] = 1 ?
NO
YES
S54
A[n1] ≦ Athsd (See note)
NO
YES
S55
A[n2] ≦ Athsd (See note)
NO
YES
S56
A[n3] ≦ Athsd (See note)
NO
YES
S57
RETRIEVE CM-START FRAME ns
(NOTE: NO if examined in the same cycle)
S58
RETRIEVE CM-END FRAME ne
S59
CALCULATE CM-START TIME Ts = T[n]
S60
CALCULATE CM LENGTH W = T[ne] - T[ns]
S61
ANY CANDIDATE THAT HAS (Ts, W) SHOWN IN THE CANDIDATE TABLE ?
NO
YES
S62
ADD (Ts, W) TO THE TABLE

FIG.5

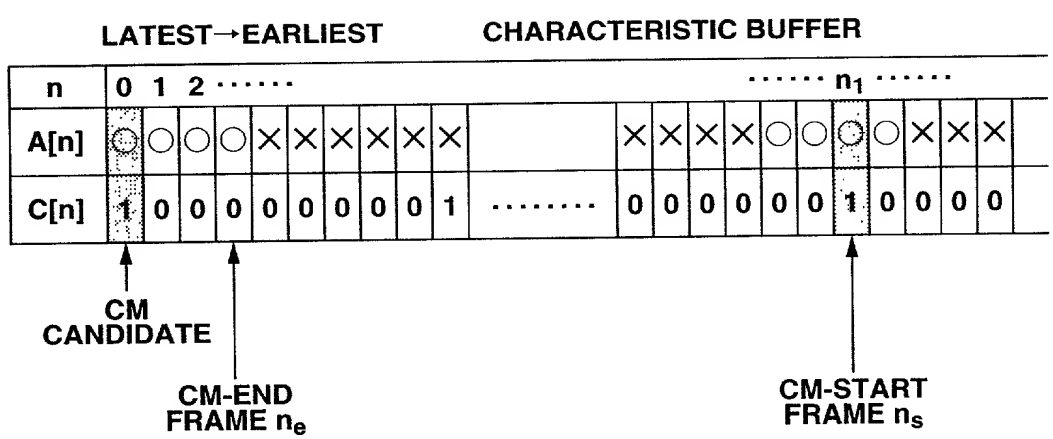

LATEST→EARLIEST
CHARACTERISTIC BUFFER
n
0 1 2 ······
······ n_1 ······
A[n]
C[n]
1 0 0 0 0 0 0 0 0 1
········
0 0 0 0 0 0 1 0 0 0 0
CM CANDIDATE
CM-END FRAME n_e
CM-START FRAME n_s

FIG.6

ITEM	SYMBOL	UNIT	EXAMPLE OF NECESSARY CONDITION (19a)	EXAMPLE OF NECESSARY CONDITION (20a)	EXAMPLE OF CONDITION DETERMINED (21a)
START TIME	Ts	hr, min., sec.	1:23'45	1:23'45	1:23'45
LENGTH (SOUND)	Tw	sec.	14.63	14.63	14.63
PRE-BREAK LENGTH	Q_1	ms	-	300.0	300.0
POST-BREAK LENGTH	Q_2	ms	-	300.0	300.0
MINIMUM WIDTH OF PRE-BREAK	Q_3	(See note)	-	0.00015	0.00015
MINIMUM WIDTH OF POST-BREAK	Q_4	(See note)	-	0.00020	0.00020
LEFT-RIGHT CORRELATION	Q_5	-	-	0.934	0.934
MEAN AMPLITUDE	Q_6	(See note)	-	0.010	0.010
NUMBER OF CUTS	Q_7	piece	-	9	9
BROADCAST MODE	Q_8	-	-	1	1
NUMBER OF ADJACENT CANDIDATES	Q_9	piece	-	2	2
ENERGY OF PRE-SPECTRUM DIFFERENCE	Q_{10}	-	-	0.41	0.41
ENERGY OF POST-SPECTRUM DIFFERENCE	Q_{11}	-	-	0.63	0.63
SCORE	R	-	-	-	1.80
SCORE	Z	-	-	-	1

*note: amount of the amplitude of the audio signal is represented as the proportion to the maximum amplitude

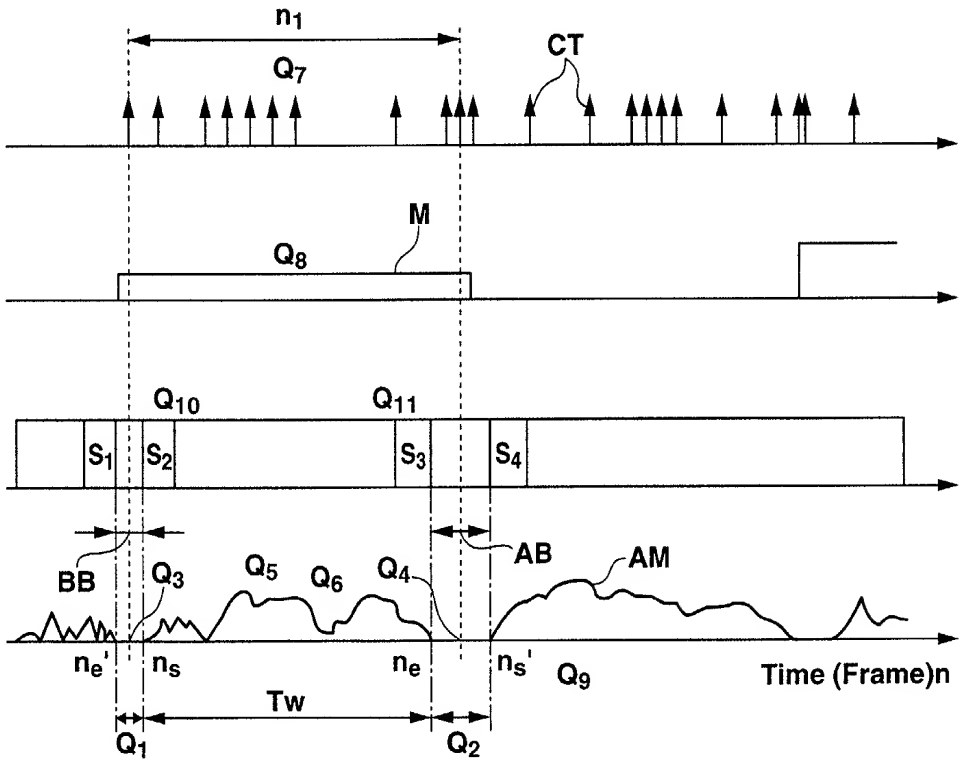
FIG.7

FIG.8A CUT-CHANGE C[n]

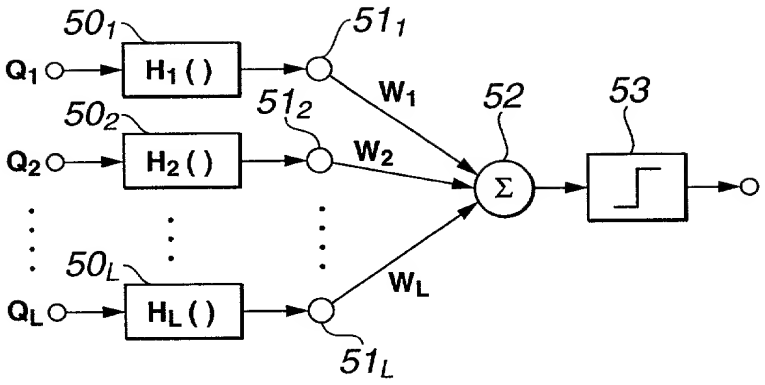
FIG.8B BROADCAST-MODE B[n]

FIG.8C SPECTRUM OF AUDIO SIGNAL S[k ; n]

FIG.8D MEAN SQUARE A[n] OF AMPLITUDE OF AUDIO SIGNAL



*USE $A_{LL}[n]$, $A_{RR}[n]$ AND $A_{LR}[n]$ TO CALCULATE Q_5



ADDITIONAL CONDITION ANALYZER 21

FIG.9

FIG.10A

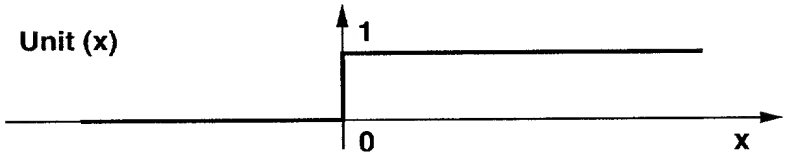


FIG.10B

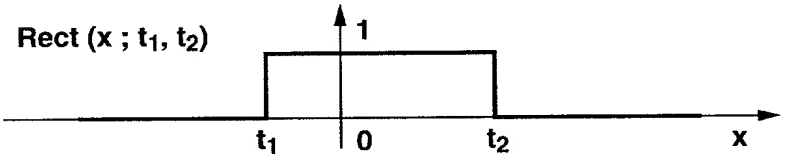
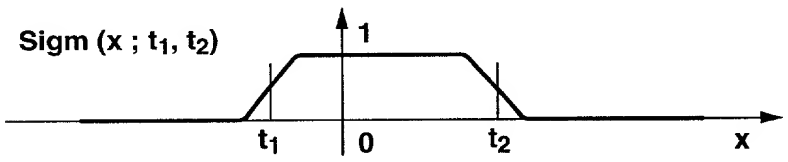


FIG.10C



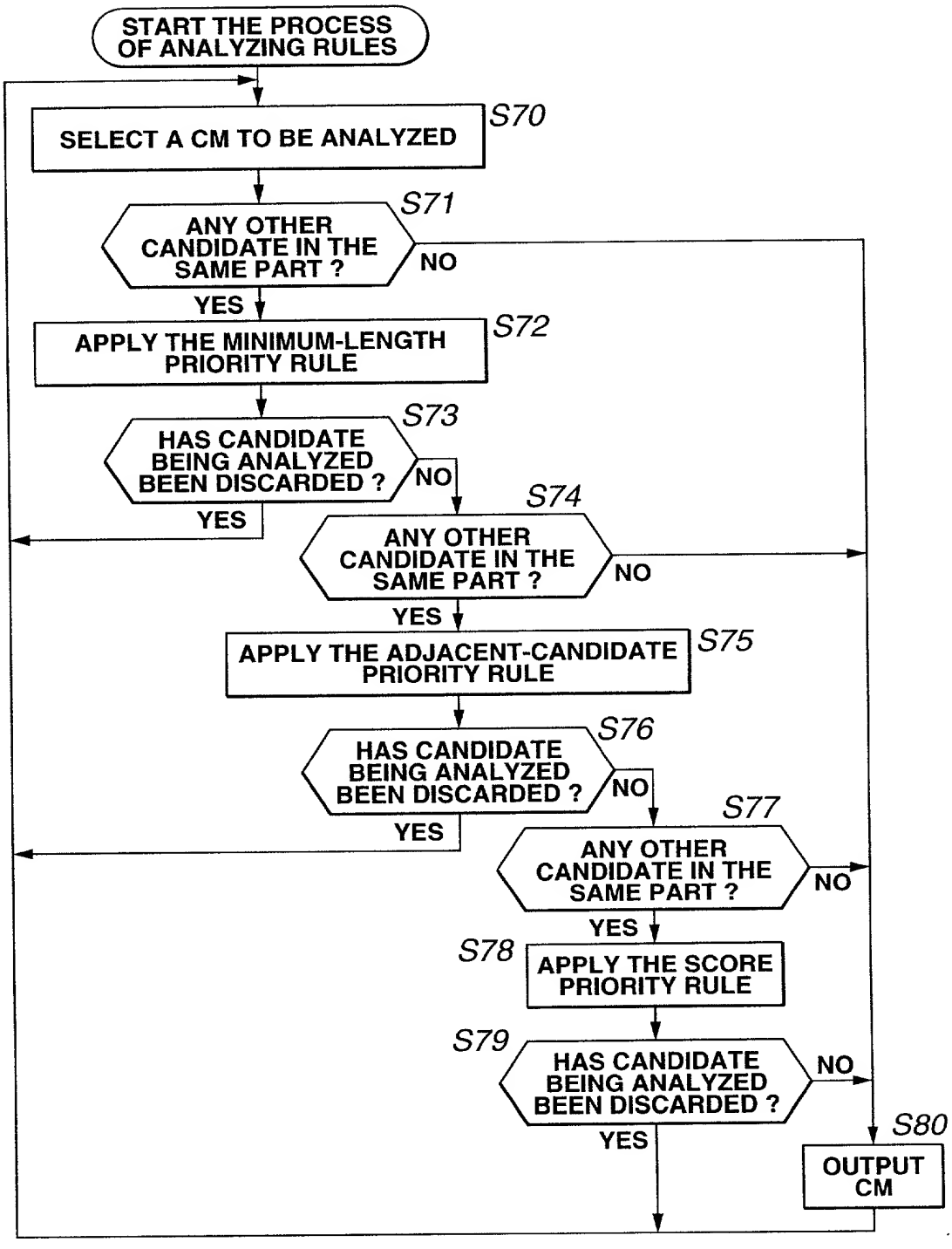

START THE PROCESS OF ANALYZING RULES
SELECT A CM TO BE ANALYZED
S70
ANY OTHER CANDIDATE IN THE SAME PART ?
S71
NO
YES
APPLY THE MINIMUM-LENGTH PRIORITY RULE
S72
HAS CANDIDATE BEING ANALYZED BEEN DISCARDED ?
S73
NO
YES
ANY OTHER CANDIDATE IN THE SAME PART ?
S74
NO
YES
APPLY THE ADJACENT-CANDIDATE PRIORITY RULE
S75
HAS CANDIDATE BEING ANALYZED BEEN DISCARDED ?
S76
NO
YES
ANY OTHER CANDIDATE IN THE SAME PART ?
S77
NO
YES
APPLY THE SCORE PRIORITY RULE
S78
HAS CANDIDATE BEING ANALYZED BEEN DISCARDED ?
S79
NO
YES
OUTPUT CM
S80

FIG.11

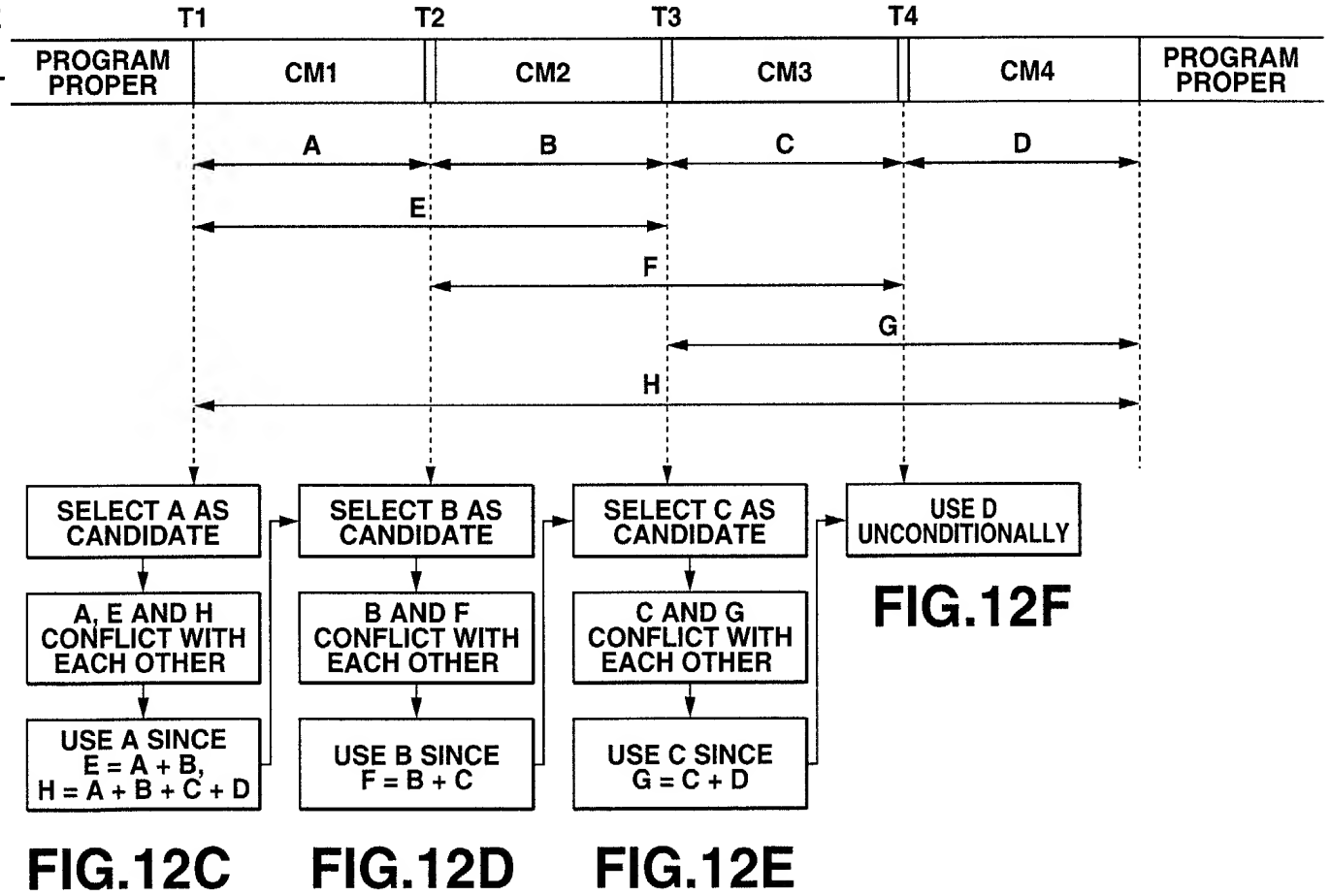


FIG.12A PROGRAM BROADCAST

FIG.12B LATEST CM CANDIDATE

FIG.12C FIG.12D FIG.12E

FIG.12F

MINIMUM-LENGTH PRIORITY RULE

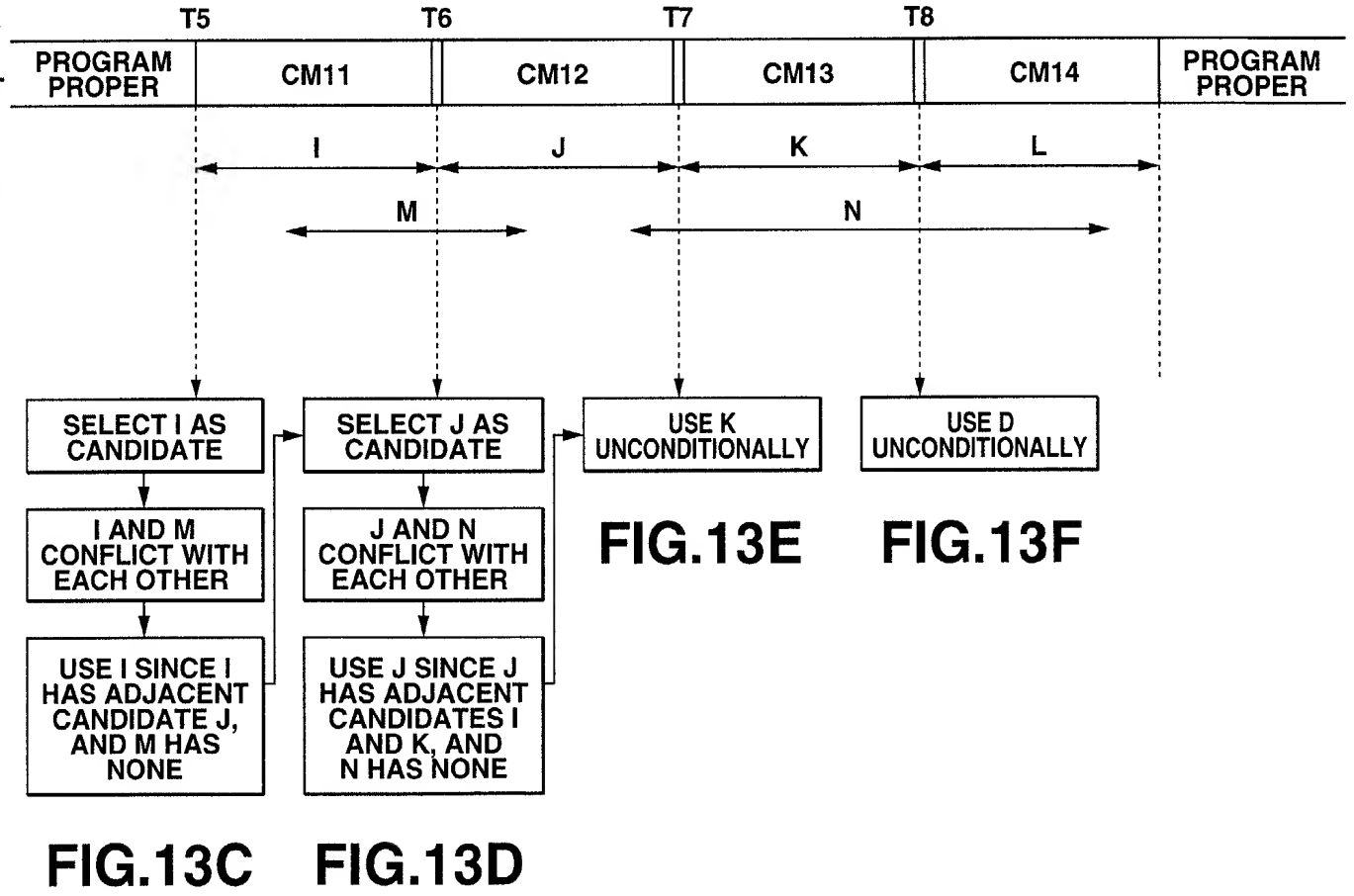


FIG.13A

FIG.13B

FIG.13C

FIG.13D

FIG.13E

FIG.13F

ADJACENT-CANDIDATE PRIORITY RULE

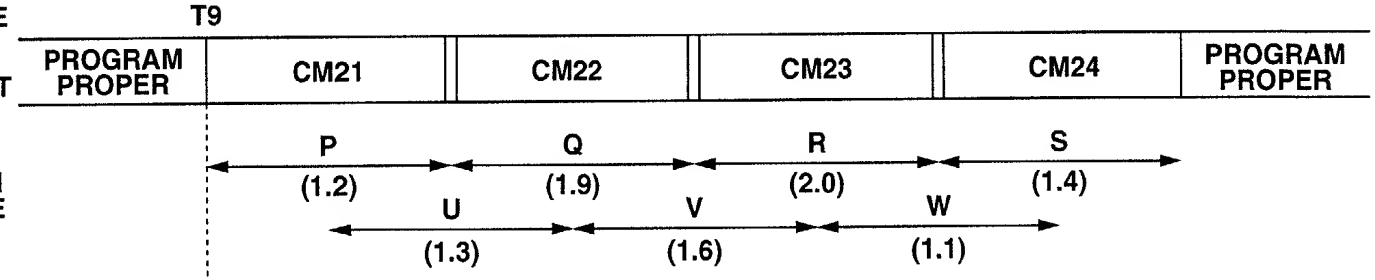


FIG.14A

FIG.14B

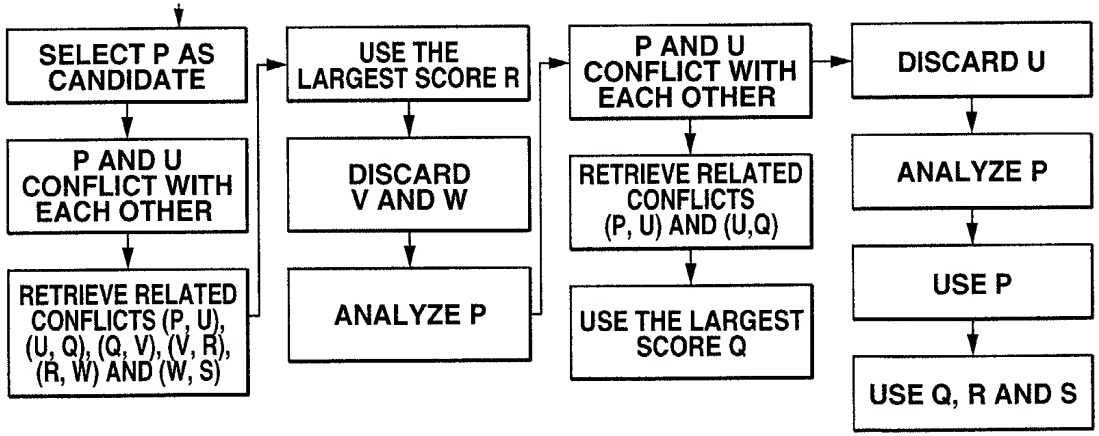


FIG.14C FIG.14D FIG.14E FIG.14F

SCORE PRIORITY RULE

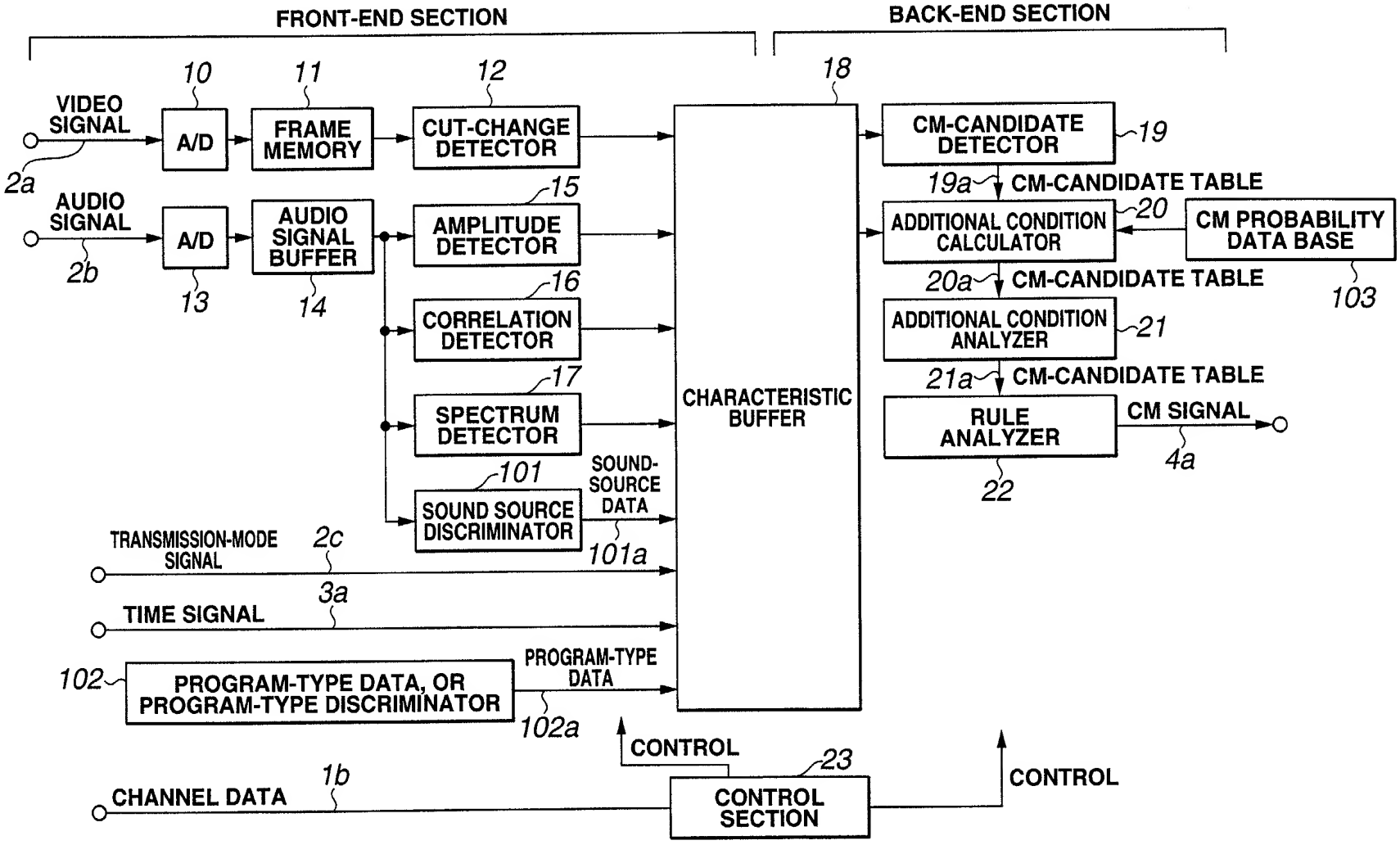


FIG.15

ITEM	SYMBOL	UNIT	EXAMPLE OF NECESSARY CONDITION (19a)	EXAMPLE OF ADDITIONAL CONDITION (20a)	EXAMPLE OF CONDITION DETERMINED (21a)
SOUND CONTAINED ?	Q_{12}	-	-	1	1
MUSIC CONTAINED ?	Q_{13}	-	-	1	1
PROBABILITY FOR TIME ZONE	Q_{14}	-	-	0.15	0.15
PROBABILITY FOR PROGRAM TYPE	Q_{15}	-	-	0.1	0.1

FIG.16

ITEM	SYMBOL	UNIT	EXAMPLE OF VALUE
NUMBER OF SMALL AMPLITUDES	Q_{16}	-	1
SMALL-AMPLITUDE PERIOD	Q_{17}	s	0.24
SIGNAL DISPERSION	Q_{18}	-	0.40

FIG.17

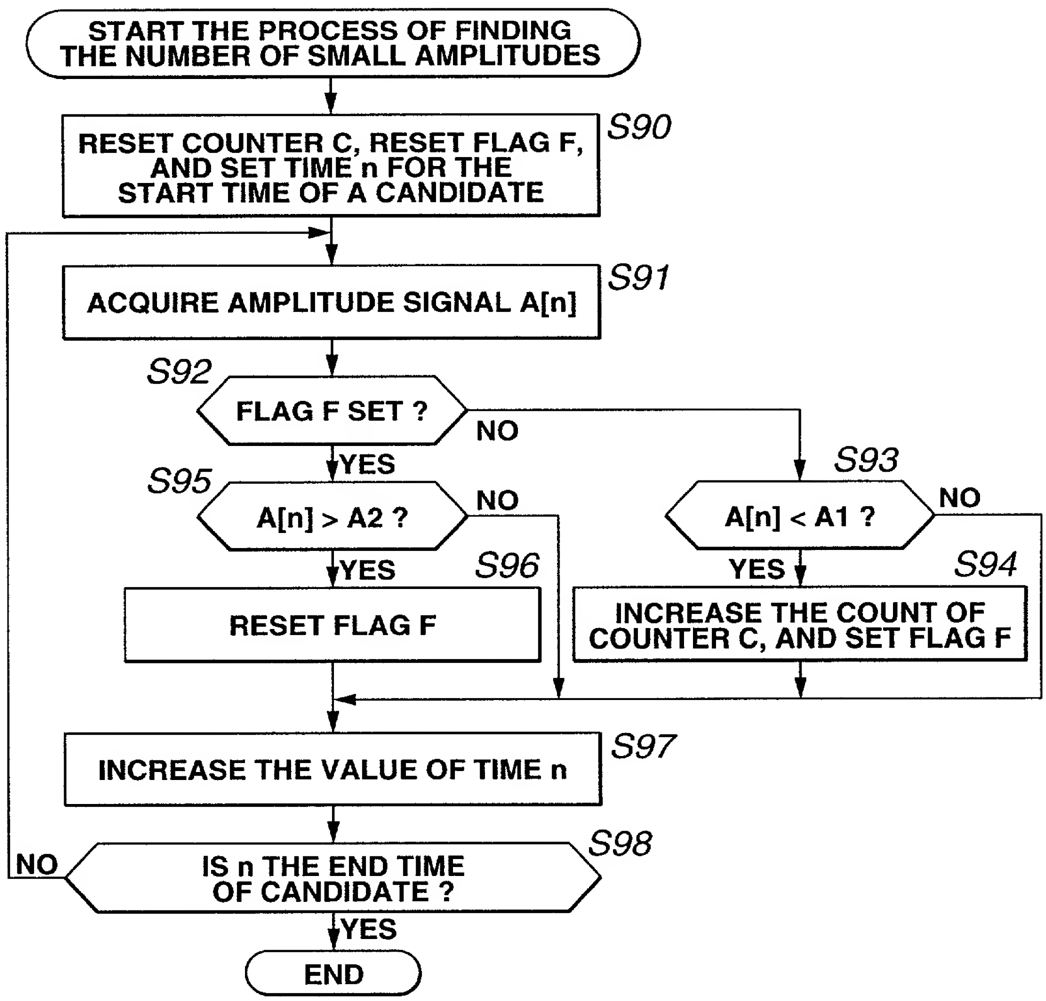
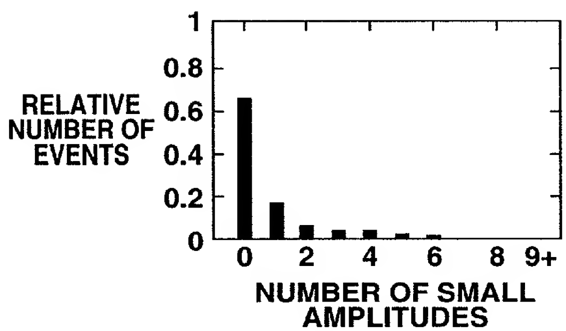
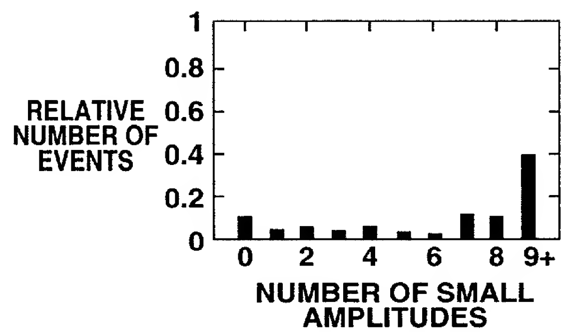

START THE PROCESS OF FINDING THE NUMBER OF SMALL AMPLITUDES
RESET COUNTER C, RESET FLAG F, AND SET TIME n FOR THE START TIME OF A CANDIDATE
S90
ACQUIRE AMPLITUDE SIGNAL A[n]
S91
S92
FLAG F SET ?
NO
YES
S95
A[n] > A2 ?
NO
YES
S96
RESET FLAG F
S93
A[n] < A1 ?
NO
YES
S94
INCREASE THE COUNT OF COUNTER C, AND SET FLAG F
INCREASE THE VALUE OF TIME n
S97
NO
IS n THE END TIME OF CANDIDATE ?
S98
YES
END

FIG.18



NUMBER OF SMALL AMPLITUDES
(IN CM PART)

FIG.19A



NUMBER OF SMALL AMPLITUDES
(IN NON-CM PART)

FIG.19B

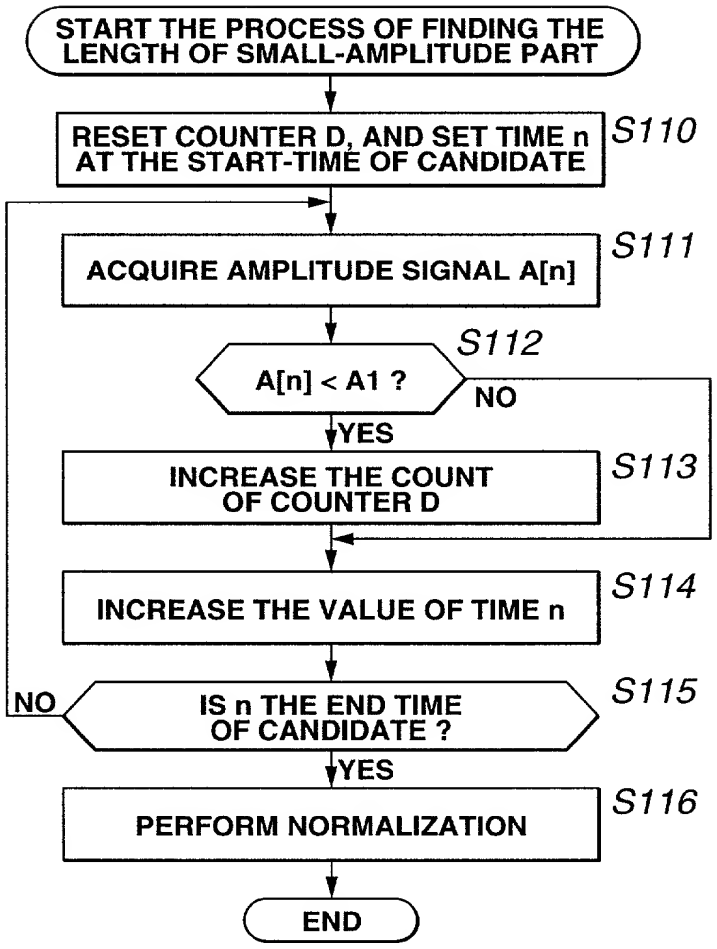
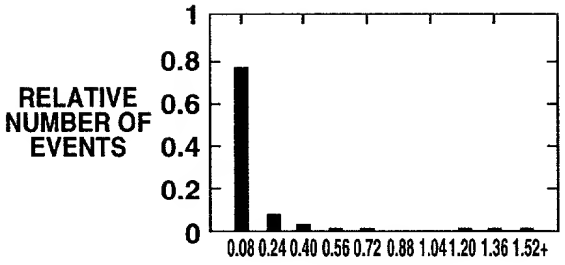
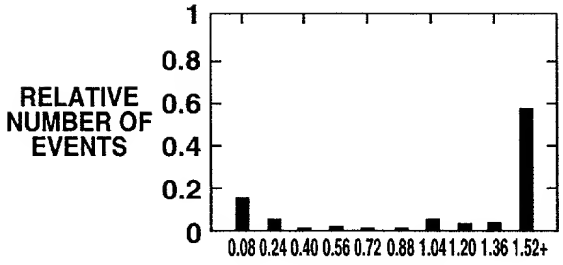

START THE PROCESS OF FINDING THE LENGTH OF SMALL-AMPLITUDE PART
RESET COUNTER D, AND SET TIME n AT THE START-TIME OF CANDIDATE
S110
ACQUIRE AMPLITUDE SIGNAL A[n]
S111
S112
A[n] < A1 ?
NO
YES
INCREASE THE COUNT OF COUNTER D
S113
INCREASE THE VALUE OF TIME n
S114
NO
IS n THE END TIME OF CANDIDATE ?
S115
YES
PERFORM NORMALIZATION
S116
END

FIG.20



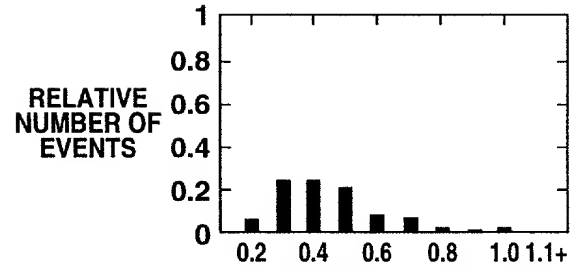
SUM OF SMALL-AMPLITUDE PERIOD (IN CM PART)

FIG.21A



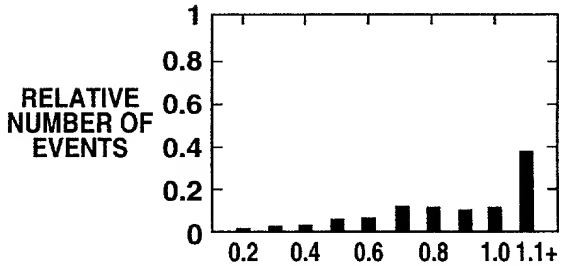
SUM OF SMALL-AMPLITUDE PERIOD (IN NON-CM PART)

FIG.21B



DISPERSION OF AMPLITUDE (IN CM PART)

FIG.22A



DISPERSION OF AMPLITUDE (IN NON-CM PART)

FIG.22B

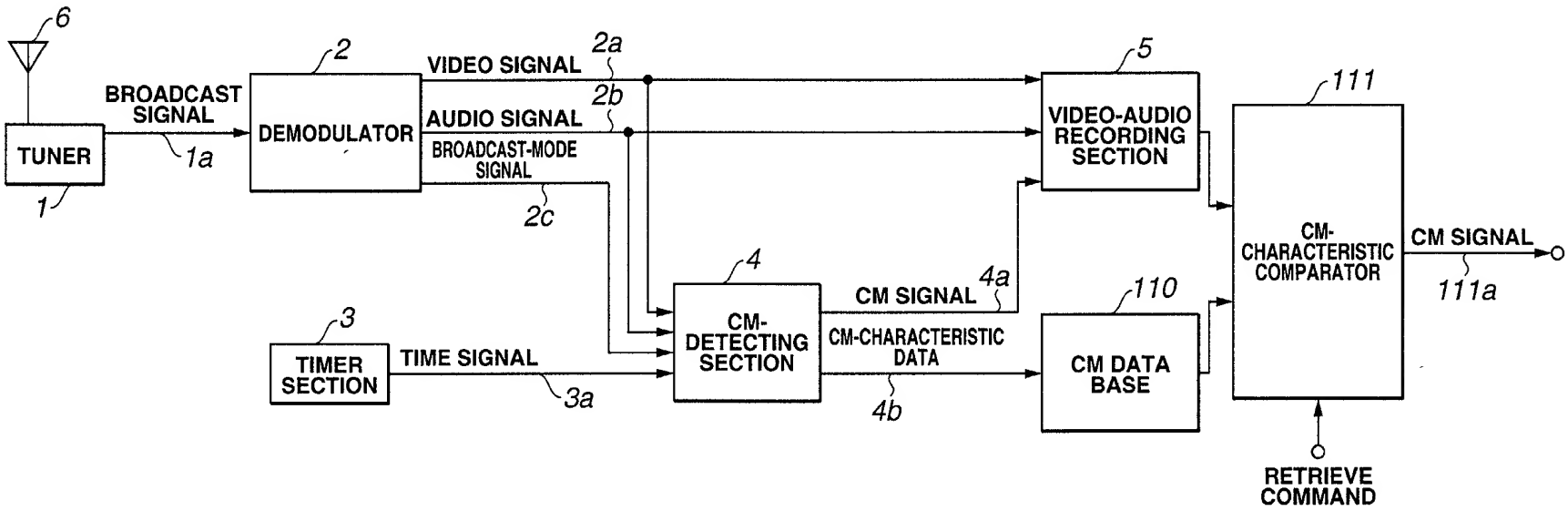


FIG.23

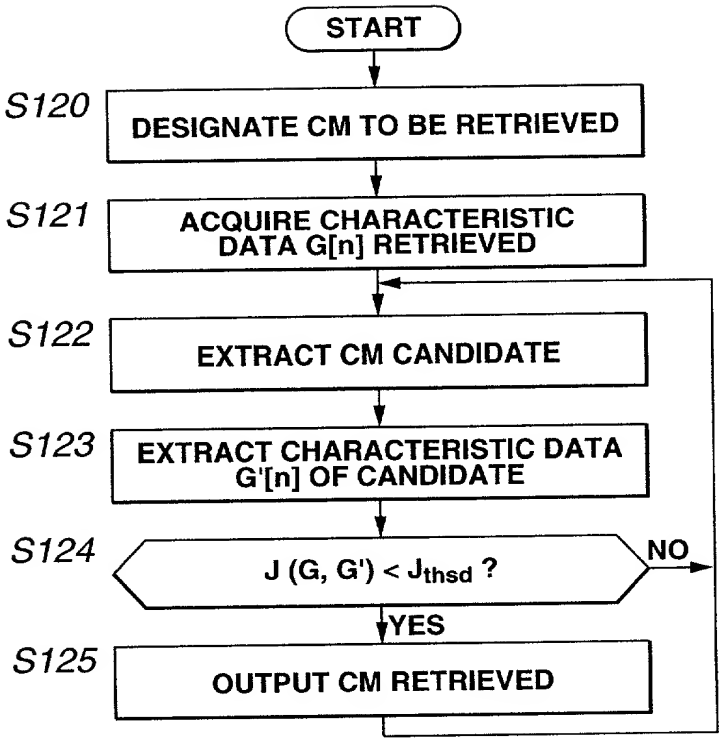


FIG.24

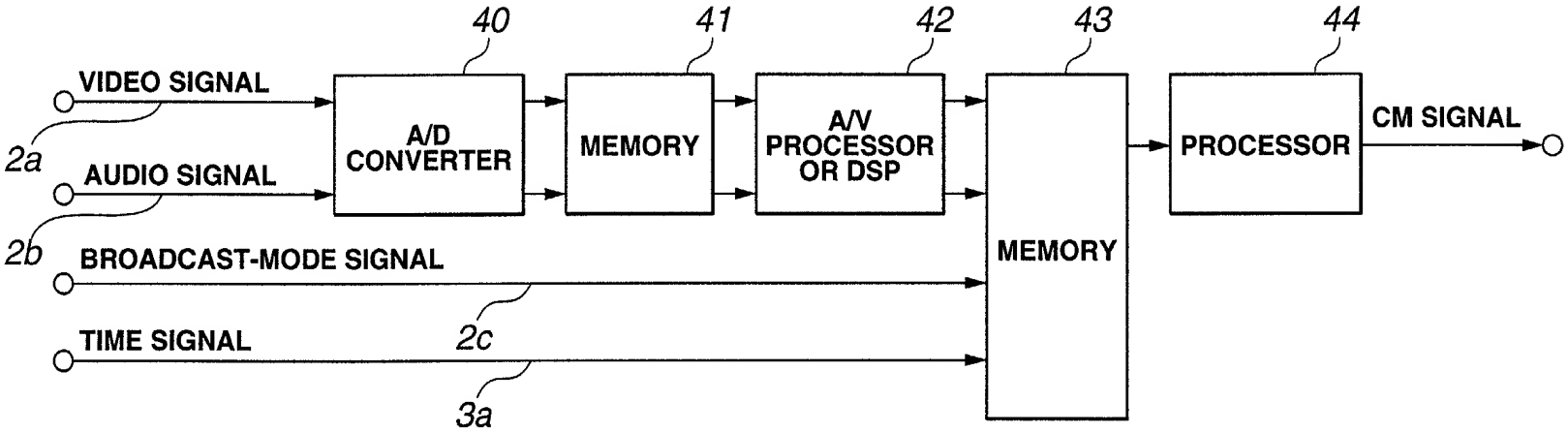

40
41
42
43
44
VIDEO SIGNAL
2a
AUDIO SIGNAL
2b
BROADCAST-MODE SIGNAL
2c
TIME SIGNAL
3a
A/D CONVERTER
MEMORY
A/V PROCESSOR OR DSP
MEMORY
PROCESSOR
CM SIGNAL

FIG.25